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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,627	04/09/2004	Carlos Angulo Barrios	1153.087US1	8932
21186 7590 08/20/2008 SCHWEGMAN, LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			EXAMINER PAK, SUNG H	
			ART UNIT 2874	PAPER NUMBER
			MAIL DATE 08/20/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/821,627

**Applicant(s)**

BARRIOS ET AL

**Examiner**

SUNG H. PAK

**Art Unit**

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 25-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 5/08/2008 have been fully considered but they are not persuasive.

Starting on "page 6" of applicant's response, it is argued that the device disclosed by Morse et al. 6,351,326 B1- hereinafter "Morse") is not a "diode", and that the device of Morse functions differently from the device claimed in the present application.

The examiner respectfully submits that even though Morse does not explicitly disclose that its resonance structure is a "diode", it fully discloses the *positively recited structural elements* of the presently claimed invention in the present application. For example, even though claim 25 recites that the claimed structures are a part of a "P-I-N diode" (last line, claim 25), there is nothing in the *positively recited structural elements* of claim 25 that require the device of claim 25 to be "diode". Indeed, Morse teaches a resonance cavity with all the positively recited structural elements as discussed in the previous office action.

Regarding the allegedly different functionality of the claimed device, the examiner respectfully submits that "while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function." *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). MPEP 2114. Since the positively recited structures are taught by Morse as discussed in the previous office action, the claim rejection is proper.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25-29, 31-33, 36-39, 41, 43-45, 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Morse et al. (US 6,351,326 B1).

Morse et al. reference discloses an electro optic modulator comprising a silicon waveguide (Fig. 1; column 3, lines 58-61); an optical resonant silicon cavity optically coupled to the waveguide (column 3 lines 56-66); a p+ doped area formed on a first side of the optical resonant cavity and an n+ doped area formed on a second side of the optical resonant cavity such that the optical resonant cavity forms an intrinsic, non-active region of a PIN diode (column 5 lines 26-44);

wherein carriers are injected into the optical resonant cavity by applying a voltage across the p+ and n+ doped areas to change the resonant frequency of the optical resonant cavity (column 5 lines 26-44);

wherein the n+ and p+ areas are electrically isolated (Fig. 2);

wherein the n+ and p+ areas are formed on an insulator (i.e. dielectric layer; column 5 lines 26-44);

wherein the injection of carriers into the optical resonant cavity by applying a voltage across the p<sup>+</sup> and n<sup>+</sup> doped areas changes the concentration of free carriers in the optical resonant cavity (column 3 lines 24-34);

wherein the concentration of free carriers in the optical resonant cavity is changed without significant heating of the cavity (column 3 lines 24-34);

wherein optical resonant cavity comprises a planar micro cavity (Fig. 1-2);

wherein the means for controlling the concentration of free carriers in the optical resonator cavity varies the refractive index of the optical resonator cavity (column 3 lines 24-34);

further comprising an external source of light optically coupled to the waveguide ('111' Fig. 1).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 30, 34-35, 40, 42, 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morse et al. (US 6,351,326 B1) in view of Morse (US 6,876,050 B2).

Morse et al. reference discloses an optical device as discussed above. However, it does not explicitly teach the use of a rib waveguide having orthogonal lateral trenches in the manner claimed in the instant application.

On the other hand, such rib waveguides and orthogonal lateral trenches in silicon electro optic modulators are well known in the art, for example, as taught by Morse (Figs. 1-7). Such features are considered advantageous and desirable in the art because: 1) rib waveguides are well known in the art to be advantageous because they provide superior lateral optical energy confinement, as compared to non-rib planar waveguides; and 2) lateral trenches are well known to provide effective and precise physical isolation of doped area of the modulators. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Morse et al. to have a rib waveguide having orthogonal lateral trenches as taught by Morse.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUNG H. PAK whose telephone number is (571)272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571)272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sung H. Pak  
Primary Examiner  
Art Unit 2874

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/Sung H. Pak/

Primary Examiner, Art Unit 2874